TRANSACTIONS

OF THE

American Society of Civil Engineers

INDEX

VOLUME LXXVI

DECEMBER, 1913

SUBJECT INDEX, PAGE 2266

AUTHOR INDEX, PAGE 2279

Titles of papers are in quotation marks when given with the author's name.

VOLUME LXXVI

SUBJECT INDEX

ADDRESSES.

"Address at the Annual Convention, in Ottawa, Ontario, June 18th, 1913." George Fillmore Swain. 1112.

AERATION.

"The Absorption of Oxygen by De-Aerated Water." Earle B. Phelps. (With Discussion.) 1624.

AGRICULTURE.

Soil surveys, Imperial Valley, California. 1271, 1527, 1555.

APPRAISAL.

See **VALUATION.**

AQUEDUCTS.

New York City water supply, Brief description of — for. 1787.

"Tufa Cement, as Manufactured and Used on the Los Angeles Aqueduct." J. B. Lippincott. (With Discussion.) 520.

ARCHES.

"A Shortened Method in Arch Computation." H. A. Sewell. 133. Discussion: William Cain, 138.

— carrying railroad tracks over streets, Philadelphia. 1852.

ASSESSMENTS.

— for street sprinkling, St. Paul, Minn. 77.

BEAMS.

"The Theorem of Three Moments." J. P. J. Williams. (With Discussion.) 785.

"Theory of Reinforced Concrete Joists." John L. Hall. 145. Discussion: Ernest McCullough, 152.

BRIDGES.

"A Shortened Method in Arch Computation." H. A. Sewell. (With Discussion.) 133.

— carrying railroad tracks over streets, Philadelphia. 1840.

"Construction Problems, Dumbarton Bridge, Central California Railway." E. J. Schneider. (With Discussion.) 1572.

"Kinetic Effects of Crowds." C. J. Tilden. 2107. Discussion: Frazer C. Hilder, Henry H. Quimby, R. D. Coombs, and J. B. French, 2127.

Lift-rail for Dumbarton Point Draw-Bridge. 1618.

"Maximum Stresses in Bascule Trusses." W. Watters Pagon. 73.

New York City — , Brief description of. 1727.

"Notes on Bridgework." S. Vilar y Boy. 241. Discussion: W. J. C. Howalt, and William P. Parker, 249.
"Specifications for Metal Railroad — Movable in a Vertical Plane." B. R. Leffler. (With Discussion.) 370.
"The Sewickley Cantilever Bridge Over the Ohio River." A. W. Buel. (With Discussion.) 582.
"The Theorem of Three Moments." J. P. J. Williams. 785. Discussion: Milo S. Ketchum, 807.

See also **COLUMNS.**

BUILDINGS.

"Kinetic Effects of Crowds." C. J. Tilden. (With Discussion.) 2107.
New York City public and semi-public —, Brief description of. 1744.

CAMPS.

"The Sanitation of Construction —." Harold Farnsworth Gray. (With Discussion.) 493.

CANALS.

"Hydrology of the Panama Canal." Caleb Mills Saville. 871. Discussion: Henry L. Abbot and W. E. Fuller, 986.
Influence of Panama Canal on Pacific ports. 215.
Lining of irrigation —. 355.

CANTILEVER BRIDGES.

"The Sewickley Cantilever Bridge Over the Ohio River." A. W. Buel. 582. Discussion: L. J. Le Conte, Charles Worthington, Theodore A. Straub, C. W. Hudson, V. R. Covell, and Henry H. Quimby, 628.

CEMENT.

Effect of sea water on —. 1026.
"On Long-Time Tests of Portland —." I. Hiroi. 1027. Discussion: Chandler Davis, L. J. Le Conte, George G. Honness, and George S. Binckley, 1033.
"Some Experiments with Mortars and Concretes Mixed with Asphaltic Oils." Arthur Taylor and Thomas Sanborn. (With Discussion.) 1094.
"The Use of — for Excluding Water from Oil Sands in Drilling Wells." Paul M. Paine. 1644.
"Tufa —, as Manufactured and Used on the Los Angeles Aqueduct." J. B. Lippincott. 520. Discussion: J. M. O'Hara, L. J. Le Conte, Ralph J. Reed, Clifford Richardson, Luther Wagoner, E. D. Knap, O. E. Mogensen, Rapier R. Coghlan, Charles H. Paul, O. W. Peterson, and Luigi Luiggi, 548.

CITIES.

"Engineering Achievements and Activities of New York City." Alfred D. Flinn. 1653.

COAL POCKETS.

—, Philadelphia Germantown and Norristown Railroad, in Philadelphia. 1876.

COALING STATIONS.

—, Philadelphia Germantown and Norristown Railroad, in Philadelphia. 1877.

COLUMNS.

"The Strength of —." W. E. Lilly. 258. Discussion: Edward Godfrey, J. O. Eckersley, Henry S. Prichard, and J. S. Branne, 275.

COMMERCE.

"Ports of the Pacific." H. M. Chittenden. (With Discussion.) 155.

CONCRETE.

"Some Experiments with Mortars and Concretes Mixed with Asphaltic Oils." Arthur Taylor and Thomas Sanborn. 1094. Discussion: Logan Waller Page, William J. Boucher, and A. T. Goldbeck, 1103.

CONTINUOUS GIRDERS.

"The Theorem of Three Moments." J. P. J. Williams. (With Discussion.) 785.

CURRENT METERS.

See **METERS.**

DAMS.

"A Western Type of Movable Weir Dam." W. C. Hammatt. (With Discussion.) 121.

"Construction of a High-Service Reservoir at Baltimore, Md." P. A. Beatty. 92.

"Fremantle Graving Dock: Steel Dam Construction for North Wall." Joshua Fielden Ramsbotham. (With Discussion.) 1942.

New York City water supply, Brief description of — for. 1787.

DEPRECIATION.

See **VALUATION.**

DOCKS.

"Fremantle Graving Dock: Steel Dam Construction for North Wall." Joshua Fielden Ramsbotham. 1942. Discussion: A. R. Archer, and Herbert E. Bellamy, 1971.

New York City —, Brief description of. 1670.

DRAW-BRIDGES.

"Construction Problems, Dumbarton Bridge, Central California Railway." E. J. Schneider. 1572. Discussion: L. J. Le Conte, R. D. Coombs, O. E. Hovey, Lewis D. Rights, and Theodore Belzner, 1614.

Lift-rail for Dumbarton Point Draw-Bridge. 1618.

See also **LIFT BRIDGES.**

DREDGING.

Rock removal and — in Pacific coast harbors. 187, 194 *et seq.*

DRILLING.

"The Use of Cement for Excluding Water from Oil Sands in — Wells." Paul M. Paine. 1644.

DRY DOCKS.

"Fremantle Graving Dock: Steel Dam Construction for North Wall." Joshua Fielden Ramsbotham. (With Discussion.) 1942.

ELECTRIC LIGHTING.

"Bibliography on Valuation of Public Utilities." 2133.

ELECTRIC MACHINERY.

"Specifications for Metal Railroad Bridges Movable in a Vertical Plane." B. R. Leffler. (With Discussion.) 370.

ELECTRIC POWER.

"Bibliography on Valuation of Public Utilities." 2133.

ELECTRIC RAILWAYS.

"Bibliography on Valuation of Public Utilities." 2133.

ELEVATED RAILROADS.

"The Elevation of the Tracks of the Philadelphia Germantown and Norristown Railroad, Philadelphia, Pa." Samuel Tobias Wagner. (With Discussion.) 1819.

ENGINEERING.

"— Achievements and Activities of New York City." Alfred D. Flinn. 1653.

"Some Tendencies and Problems of the Present Day and the Relation of the Engineer Thereto." Address at the Annual Convention, in Ottawa, Ontario, June 18th, 1913. George Fillmore Swain. 1112.

ETHICS.

"Some Tendencies and Problems of the Present Day and the Relation of the Engineer Thereto." Address at the Annual Convention, in Ottawa, Ontario, June 18th, 1913. George Fillmore Swain. 1112.

EVAPORATION.

— experiments, Salton Sea. 1516.

"Hydrology of the Panama Canal." Caleb Mills Saville. (With Discussion.) 871.

EXCAVATION.

"Construction of a High-Service Reservoir at Baltimore, Md." P. A. Beatty. 92.

FIRE PROTECTION.

New York City high-pressure system, Brief description of. 1809.

FLOODS.

— in Chagres River. 944, 987.

"Irrigation and River Control in the Colorado River Delta." H. T. Cory. (With Discussion.) 1204.

"The Flood of March 22d, 1912, at Pittsburgh, Pa." Kenneth C. Grant. 302. Discussion: L. J. Le Conte, William R. Copeland, Jean de Pulligny, J. Waldo Smith, and Morris Knowles, 326.

FLOORS.

"Kinetic Effects of Crowds." C. J. Tilden. (With Discussion.) 2107.

FOUNDATIONS.

"Construction Problems, Dumbarton Bridge, Central California Railway." E. J. Schneider. (With Discussion.) 1572.

"Fremantle Graving Dock: Steel Dam Construction for North Wall." Joshua Fielden Ramsbotham. (With Discussion.) 1942.

GAS AND GAS-WORKS.

"Bibliography on Valuation of Public Utilities." 2133.

GEOLOGY.

New York City geological maps, sections, etc. 1654.

GIRDERS.

"The Theorem of Three Moments." J. P. J. Williams. (With Discussion.) 785.

GRADE CROSSINGS.

"The Elevation of the Tracks of the Philadelphia Germantown and Norristown Railroad, Philadelphia, Pa." Samuel Tobias Wagner. (With Discussion.) 1819.

GROUND-WATER.

"The Infiltration of — into Sewers." John N. Brooks. (With Discussion.) 1909.

GROUTING.

Machine for —. 1960.

HARBORS.

Columbia River, — on. 161 *et seq.*

Los Angeles Harbor, Description of. 160 *et seq.*

New York Harbor, Brief description of. 1654, 1666.

Portland, Ore., Harbor, Description of. 175 *et seq.*

"Ports of the Pacific." H. M. Chittenden, Assisted by A. O. Powell. 155. Discussion: L. J. Le Conte, E. P. Goodrich, and Lewis M. Haupt, 221.

Prince Rupert, B. C., Harbor, Description of. 165 *et seq.*

Puget Sound, Description of — on. 163 *et seq.*

San Diego Harbor, Description of. 160 *et seq.*

San Francisco Bay and Harbor, Description of. 159 *et seq.*

Seattle Harbor, Description of. 179 *et seq.*

Tacoma Harbor, Description of. 182 *et seq.*

"Tidal Phenomena in the Harbor of New York." H. de B. Parsons. 1979. Discussion: Allen Hazen, T. Kennard Thomson, James Owen, and Kenneth Allen, 2094.

Vancouver, B. C., Harbor, Description of. 165 *et seq.*

HEAD-GATES.
— , irrigation canals, Imperial Valley, California. 1302 *et seq.*

HYDRAULICS.
See **WATER, FLOW OF.**

IRRIGATION.
"— and River Control in the Colorado River Delta." H. T. Cory. (With Discussion.) 1204.
"State and National Water Laws, with Detailed Statement of the Oregon System of Water Titles." John H. Lewis. (With Discussion.) 637.
"The Economic Aspect of Seepage and Other Losses in — Systems." E. G. Hopson. 336. Discussion: L. J. Le Conte, W. C. Hammatt, and Luther Wagoner, 364.

JETTIES.
— at Aransas Pass, Texas. 234.
— for Pacific coast harbors. 228.

JOISTS.
See **BEAMS.**

LAW.
See **WATER LAWS.**

LEVEES.
"Irrigation and River Control in the Colorado River Delta." H. T. Cory. (With Discussion.) 1204.

LEVELING.
"Recent Improvements in — Instruments." Dunbar D. Scott. 1172.

LIFT BRIDGES.
"Maximum Stresses in Bascule Trusses." W. Watters Pagon. 73.
"Specifications for Metal Railroad Bridges Movable in a Vertical Plane." B. R. Leffler. 370. Discussion: Augustus Smith, Charles H. Mercer, and P. J. Reich, 403.

MEMOIRS OF DECEASED MEMBERS.
Archibald, Peter Suther. 2199.
Atterbury, Charles De La Plane. 2252.
Baily, Thomas Chalkley James, Jr. 2201.
Bell, Andrew. 2203.
Brinsmade, Daniel Seymour. 2205.
Carter, Alfred Ellsworth. 2207.
Coombs, Philip Henry. 2210.
Cooper, Samuel Lispenard. 2212.
Crysler, Arthur Garfield. 2254.
Francis, George Blinn. 2214.
Gray, George Edward. 2198.
Harrison, Charles Lewis. 2218.
Harrod, Benjamin Morgan. 2194.

Hawkesworth, John. 2255.
Holman, Stephen. 2262.
Horton, Horace Ebenezer. 2221.
Howe, William Bell White. 2234.
Jackson, Thomas Moore. 2236.
Lockwood, William Frederick. 2238.
Mohun, Edward. 2239.
Myers, William Madison. 2256.
Puffer, William Haselton. 2241.
Schuyler, James Dix. 2243.
Soulé, Frank. 2246.
Tisdale, Charles Harry. 2258.
Wheeler, Ebenezer Smith. 2249.
White, Henry Fisher. 2251.
Wise, James Hugh. 2260.

METALS.

Specifications for special — used in machinery for lift bridges. 398 *et seq.*

METERS.

"A Mechanism for Metering and Recording the Flow of Fluids Through Venturi Tubes, Orifices, or Conduits, by Integrating the Velocity Head." J. W. Ledoux. 1148.

"Characteristics of Cup and Screw Current —; Performance of These — in Tail-Races and Large Mountain Streams; Statistical Synthesis of Discharge Curves." B. F. Groat. 819. Discussion: W. G. Price, E. E. Haskell, Charles H. Miller, John C. Hoyt, and C. W. Staniford, 841.

MINING.

"Bibliography on Valuation of Public Utilities." 2133.

MOMENTS.

"The Theorem of Three —." J. P. J. Williams. (With Discussion.) 785.

MORTARS.

"Some Experiments with — and Concretes Mixed with Asphaltic Oils." Arthur Taylor and Thomas Sanborn. (With Discussion.) 1094.

MOSQUITOES.

"Prevention of Mosquito Breeding." Spencer Miller. 759. Discussion: Harold Farnsworth Gray, J. J. Rosenthal, E. P. Felt, Ralph H. Hunt, Robert A. Rutherfurd, Kenneth Allen, W. E. Britton, and Thomas H. Means, 767.

"The Sanitation of Construction Camps." Harold Farnsworth Gray. (With Discussion.) 493.

MOTORS.

"Specifications for Metal Railroad Bridges Movable in a Vertical Plane." B. R. Leffler. (With Discussion.) 370.

MOVABLE DAMS.

"A Western Type of Movable Weir Dam." W. C. Hammatt. 121. Discussion: Thomas C. Atwood, 130.

OCEAN CURRENTS.

"Tidal Phenomena in the Harbor of New York." H. de B. Parsons. (With Discussion.) 1979.

OIL WELLS.

See **WELLS.**

OPTICS.

"Recent Improvements in Leveling Instruments." Dunbar D. Scott. 1172.

PAVEMENTS.

New York City —, Brief description of. 1737.

PILES.

"Construction Problems, Dumbarton Bridge, Central California Railway." E. J. Schneider. (With Discussion.) 1572.

Steel — used in north wall of Fremantle Graving Dock. 1950.

PIPE.

"Experimental Determination of Loss of Head Due to Sudden Enlargement in Circular Pipes." W. H. Archer. 999.

Infiltration of water into sewer —. 1909.

PIPE LINES.

"Tufa Cement, as Manufactured and Used on the Los Angeles Aqueduct." J. B. Lippincott. (With Discussion.) 520.

PITOT TUBES.

"Characteristics of Cup and Screw Current Meters; Performance of These Meters in Tail-Races and Large Mountain Streams; Statistical Synthesis of Discharge Curves." B. F. Groat. (With Discussion.) 819.

Meters for recording flow as indicated by —. 1148.

PORTS.

See **HARBORS.**

POWER PLANTS.

"Bibliography on Valuation of Public Utilities." 2133.

PRESERVATION OF TIMBER.

"Tests of Creosoted Timber." W. B. Gregory. 1192.

QUAY WALLS.

See **RETAINING WALLS.**

RAILROAD STATIONS.

New York Central and Pennsylvania — in New York City, Brief description of. 1680.

—, Philadelphia Germantown and Norristown Railroad, in Philadelphia. 1865.

RAILROAD TERMINALS.

New York Central and Pennsylvania — in New York City, Brief description of. 1680.

RAILROAD YARDS.

—, Philadelphia Germantown and Norristown Railroad, in Philadelphia. 1874.

RAILROADS.

"Bibliography on Valuation of Public Utilities." 2133.

Brief description of — terminating in New York City. 1680.

"The Elevation of the Tracks of the Philadelphia Germantown and Norristown Railroad, Philadelphia, Pa." Samuel Tobias Wagner. 1819. Discussion: J. P. Snow, E. W. Lewis, Charles Rufus Harte, and George S. Webster, 1900.

See also **UNDERGROUND RAILWAYS.**

RAILS.

"A Brief Description of a Modern Street Railway Track Construction." A. C. Polk. (With Discussion.) 455.

Lift-rail for Dumbarton Point Draw-Bridge. 1618.

RAINFALL.

"Hydrology of the Panama Canal." Caleb Mills Saville. (With Discussion.) 871.

REFUSE DISPOSAL.

"The Sanitation of Construction Camps." Harold Farnsworth Gray. (With Discussion.) 493.

REINFORCED CONCRETE.

Tests of — slabs made with tufa cement for Los Angeles Aqueduct. 535.

"Theory of — Joists." John L. Hall. (With Discussion.) 145.

RESERVOIRS.

"Construction of a High-Service Reservoir at Baltimore, Md." P. A. Beatty. 92.

Lists of — for flood prevention or river control in the United States and foreign countries. 1463 *et seq.*

New York City water supply, Brief description of — for. 1787.

Prevention of floods by means of storage —. 302.

— for control of floods in rivers. 1455 *et seq.*

"The Economic Aspect of Seepage and Other Losses in Irrigation Systems." E. G. Hopson. (With Discussion.) 336.

RETAINING WALLS.

"Fremantle Graving Dock: Steel Dam Construction for North Wall." Joshua Fielden Ramsbotham. (With Discussion.) 1942.

— and abutments, track elevation, Philadelphia. 1833.

RIVERS.

"Irrigation and River Control in the Colorado River Delta." H. T. Cory. 1204. Discussion: L. J. Le Conte, Morris Knowles, Francis L. Sellew, Elwood Mead, W. W. Follett, R. H. Forbes, R. S. Buck, F. T. Robson, Andrew M. Chaffey, C. E. Grunsky, Clarence K. Clarke, and U. S. Marshall, 1454.

"The Flood of March 22d, 1912, at Pittsburgh, Pa." Kenneth C. Grant. (With Discussion.) 302.

ROADS.

"A Suggested Improvement in Building Water-Bound Macadam — ." J. L. Meem. 988. Discussion: F. G. Frink, C. H. Sweetser, W. W. Crosby, J. C. Meem, and Arthur H. Blanchard, 991.

RUN-OFF.

"Hydrology of the Panama Canal." Caleb Mills Saville. (With Discussion.) 871.

SANITATION.

"Prevention of Mosquito Breeding." Spencer Miller. (With Discussion.) 759.

"The — of Construction Camps." Harold Farnsworth Gray. 493. Discussion: R. C. Hardman, Spencer Miller, Frank E. Winsor, W. E. Britton, F. W. Austin, and Harry G. Payrow, 509.

SEEPAGE.

"The Economic Aspect of — and Other Losses in Irrigation Systems." E. G. Hopson. (With Discussion.) 336.

SEWAGE DISPOSAL.

"The Absorption of Oxygen by De-Aerated Water." Earle B. Phelps. 1624. Discussion: W. E. Adeney, 1637.

"Tidal Phenomena in the Harbor of New York." H. de B. Parsons. (With Discussion.) 1979.

SEWERAGE.

New York City —, Brief description of. 1721, 1775.

"The Infiltration of Ground-Water into Sewers." John N. Brooks. 1909. Discussion: John H. Gregory, Edward S. Rankin, Kenneth Allen, G. L. Christian, E. Kuichling, E. G. Bradbury, and Marshall R. Pugh, 1916.

SIGNALING.

—, Philadelphia Germantown and Norristown Railroad. 1884.

SIPHONS.

Sewer — under subways, New York City. 1721.

SOCIAL PROBLEMS.

"Some Tendencies and Problems of the Present Day and the Relation of the Engineer Thereto." Address at the Annual Convention, in Ottawa, Ontario, June 18th, 1913. George Fillmore Swain. 1112.

STEAM POWER.

"Bibliography on Valuation of Public Utilities." 2133.

STREET RAILWAYS.

"A Brief Description of a Modern Street Railway Track Construction." A. C. Polk. (With Discussion.) 455.

"Bibliography on Valuation of Public Utilities." 2133.

STREET SPRINKLING.

"— in St. Paul, Minn." C. L. Annan. 77. Discussion: S. Whinery, and A. H. Blanchard, 87.

STRESS.

"Maximum Stresses in Bascule Trusses." W. Watters Pagon. 73.

SUBWAYS.

See **UNDERGROUND RAILWAYS.**

SURVEYING.

"Recent Improvements in Leveling Instruments." Dunbar D. Scott. 1172.

United States land surveys, Imperial Valley, California. 1269.

TELEGRAPH.

"Bibliography on Valuation of Public Utilities." 2133.

TELEPHONES.

"Bibliography on Valuation of Public Utilities." 2133.

TIDES.

"Tidal Phenomena in the Harbor of New York." H. de B. Parsons. (With Discussion.) 1979.

TIMBER.

Jarrah — used in construction. 1948, 1972.

"Tests of Creosoted — ." W. B. Gregory. 1192.

TRACK.

"A Brief Description of a Modern Street Railway — Construction." A. C. Polk. 455. Discussion: E. E. R. Tratman, Walter C. Howe, Louis A. Mitchell, William J. Boucher, and C. B. Vorce, 466.

TRUSSES.

"Maximum Stresses in Bascule — ." W. Watters Pagon. 73.

TUNNELS.

Brief description of — under North and East Rivers, New York City. 1690.

Water tunnel, New York City. 1805.

UNDERGROUND RAILWAYS.

New York City — , Brief description of. 1717.

"The Sixth Avenue Subway of the Hudson and Manhattan Railroad." H. G. Burrowes. 1. Discussion: T. B. Whitney, Jr., William J. Boucher, Lazarus White, and H. L. Oestreich, 66.

UNDERGROUND WATER.

See **GROUND-WATER.**

UNDERPINNING.

— elevated railway and buildings on line of Hudson and Manhattan Railroad, New York. 1.

VALUATION.

"Bibliography on — of Public Utilities." 2133.

VIADUCTS.

— , elevation of railroad tracks, Philadelphia. 1845.

WATER.

Analyses of — , New River, Colorado River, Salton Sea, etc. 1411.

"The Absorption of Oxygen by De-Aerated —." Earle B. Phelps. (With Discussion.) 1624.

WATER, FLOW OF, IN OPEN CHANNELS.

"Characteristics of Cup and Screw Current Meters; Performance of These Meters in Tail-Races and Large Mountain Streams; Statistical Synthesis of Discharge Curves." B. F. Groat. (With Discussion.) 819.

WATER, FLOW OF, IN PIPES.

"A Mechanism for Metering and Recording the Flow of Fluids Through Venturi Tubes, Orifices, or Conduits, by Integrating the Velocity Head." J. W. Ledoux. 1148.

"Experimental Determination of Loss of Head Due to Sudden Enlargement in Circular Pipes." W. H. Archer. 999.

WATER, FLOW OF, OVER DAMS AND WEIRS.

"Experiments on Weir Discharge." W. G. Steward and J. S. Longwell. 1045. Discussion: C. H. Pierce, and Francis F. Longley, 1078.

WATER LAWS.

"State and National — , with Detailed Statement of the Oregon System of Water Titles." John H. Lewis. 637. Discussion: Clarence T. Johnston, L. J. Le Conte, George L. Dillman, W. E. Moore, Morris Bien, Horace W. Sheley, Morris Knowles, Kenneth C. Grant, E. G. Hopson, H. T. Cory, O. C. Merrill, William G. Davies, and W. B. Freeman, 677.

— , Imperial Valley, California. 1507.

WATER POWER.

"Bibliography on Valuation of Public Utilities." 2133.

"State and National Water Laws, with Detailed Statement of the Oregon System of Water Titles." John H. Lewis. (With Discussion.) 637.

WATER-PROOFING.

"Some Experiments with Mortars and Concretes Mixed with Asphaltic Oils." Arthur Taylor and Thomas Sanborn. (With Discussion.) 1094.

— bridges and viaducts, track elevation, Philadelphia. 1853, 1900, 1906.

— underground structures. 47, 68 *et seq.*

WATER-WORKS.

"Bibliography on Valuation of Public Utilities." 2133.

New York City —, Brief description of. 1787.

WEIRS.

See **WATER, FLOW OF.**

WELLS.

"The Use of Cement for Excluding Water from Oil Sands in Drilling —." Paul M. Paine. 1644.

AUTHOR INDEX

ABBOT, HENRY L.
Hydrology of the Panama Canal. 986.

ADENEY, W. E.
Absorption of oxygen. 1637.

ALLEN, KENNETH.
Ground-water in sewers. 1919.
Prevention of mosquito breeding. 776.
Tidal phenomena in New York Harbor. 2099.

ANNAN, C. L.
"Street Sprinkling in St. Paul, Minn." 77.

ARCHER, A. R.
Dam for Fremantle Graving Dock. 1971.

ARCHER, W. H.
"Experimental Determination of Loss of Head Due to Sudden Enlargement in Circular Pipes." 999.

ARCHIBALD, PETER SUTHER.
Memoir of. 2199.

ATTERBURY, CHARLES DE LA PLANE.
Memoir of. 2252.

ATWOOD, THOMAS C.
Movable weir dams. 130.

AUSTIN, F. W.
Sanitation of construction camps. 514.

BAILY, THOMAS CHALKLEY JAMES, JR.
Memoir of. 2201.

BEATTY, P. A.
"Construction of a High-Service Reservoir at Baltimore, Md." 92.

BELL, ANDREW.
Memoir of. 2203.

BELLAMY, HERBERT E.
Dam for Fremantle Graving Dock. 1972.

BELZNER, THEODORE.
Dumbarton Bridge construction. 1621.

BIEN, MORRIS.
State and national water laws. 694.

BINCKLEY, GEORGE S.
Long-time tests of Portland cement. 1039.

BLANCHARD, A. H.
Street sprinkling. 88.
Water-bound macadam roads. 994.

BOUCHER, WILLIAM J.
Oil-mixed mortars and concretes. 1107.
Sixth Avenue Subway, Hudson & Manhattan R. R. 68.
Street railway track construction. 475.

BRADBURY, E. G.
Ground-water in sewers. 1931.

BRANNE, J. S.
Strength of columns. 294.

BRINSMADE, DANIEL SEYMOUR.
Memoir of. 2205.

BRITTON, W. E.
Prevention of mosquito breeding. 777.
Sanitation of construction camps. 513.

BROOKS, JOHN N.
"The Infiltration of Ground-Water into Sewers." 1909.

BUCK, R. S.
Irrigation and river control. 1515.

BUEL, A. W.
"The Sewickley Cantilever Bridge Over the Ohio River." 582.

BURROWES, H. G.
"The Sixth Avenue Subway of the Hudson and Manhattan Railroad." 1.

CAIN, WILLIAM.
Shortened arch computations. 138.

CARTER, ALFRED ELLSWORTH.
Memoir of. 2207.

CHAFFEY, ANDREW M.
Irrigation and river control. 1524.

CHITTENDEN, H. M.
"Ports of the Pacific." 155.

CHRISTIAN, G. L.
Ground-water in sewers. 1923.

CLARKE, CLARENCE K.
Irrigation and river control. 1542.

COGHLAN, RAPIER R.
Tufa cement. 559.

COOMBS, PHILIP HENRY.
Memoir of. 2210.

COOMBS, R. D.
Dumbarton Bridge construction. 1615.
Kinetic effects of crowds. 2129.

COOPER, SAMUEL LISPENARD.
Memoir of. 2212.

COPELAND, WILLIAM R.
Pittsburgh flood of March 22d, 1912. 327.

CORY, H. T.
"Irrigation and River Control in the Colorado River Delta." 1204.
State and national water laws. 714.

COVELL, V. R.
The Sewickley Cantilever Bridge. 631.

CROSBY, W. W.
Water-bound macadam roads. 992.

CRYSLER, ARTHUR GARFIELD.
Memoir of. 2254.

DAVIES, WILLIAM G.
State and national water laws. 727.

DAVIS, CHANDLER.
Long-time tests of Portland cement. 1033.

DILLMAN, GEORGE L.
State and national water laws. 690.

ECKERSLEY, J. O.
Strength of columns. 280.

FELT, E. P.
Prevention of mosquito breeding. 771.

FLINN, ALFRED D.
"Engineering Achievements and Activities of New York City." 1653.

FOLLETT, W. W.
Irrigation and river control. 1511.

FORBES, R. H.
Irrigation and river control. 1513.

FRANCIS, GEORGE BLINN.
Memoir of. 2214.

FREEMAN, W. B.
State and national water laws. 734.

FRENCH, J. B.
Kinetic effects of crowds. 2129.

FRINK, F. G.
Water-bound macadam roads. 991.

FULLER, W. E.
Hydrology of the Panama Canal. 987.

GODFREY, EDWARD.
Strength of columns. 275.

GOLDBECK, A. T.
Oil-mixed mortars and concretes. 1108.

GOODRICH, E. P.
Ports of the Pacific. 223.

GRANT, KENNETH C.
State and national water laws. 704.
"The Flood of March 22d, 1912, at Pittsburgh, Pa." 302.

GRAY, GEORGE EDWARD.
Memoir of. 2198.

GRAY, HAROLD FARNSWORTH.
Prevention of mosquito breeding. 767.
"The Sanitation of Construction Camps." 493.

GREGORY, JOHN H.
Ground-water in sewers. 1916.

GREGORY, W. B.
"Tests of Creosoted Timber." 1192.

GROAT, B. F.
"Characteristics of Cup and Screw Current Meters; Performance of These Meters in Tail-Races and Large Mountain Streams; Statistical Synthesis of Discharge Curves." 819.

GRUNSKY, C. E.
Irrigation and river control. 1533.

HALL, JOHN L.
"Theory of Reinforced Concrete Joists." 145.

HAMMATT, W. C.
"A Western Type of Movable Weir Dam." 121.
Seepage losses in irrigation systems. 366.

HARDMAN, R. C.
Sanitation of construction camps. 509.

HARRISON, CHARLES LEWIS.
Memoir of. 2218.

HARROD, BENJAMIN MORGAN.
Memoir of. 2194.

HARTE, CHARLES RUFUS.
Track elevation. 1900.

HASKELL, E. E.
Cup and screw current meters. 844.

HAUPT, LEWIS M.
Ports of the Pacific. 228.

HAWKESWORTH, JOHN.
Memoir of. 2255.

HAZEN, ALLEN.
Tidal phenomena in New York Harbor. 2094.

HILDER, FRAZER C.
Kinetic effects of crowds. 2127.

HIROI, I.
"On Long-Time Tests of Portland Cement." 1027.

HOLMAN, STEPHEN.
Memoir of. 2262.

HONNESS, GEORGE G.
Long-time tests of Portland cement. 1036.

HOPSON, E. G.
State and national water laws. 712.
"The Economic Aspect of Seepage and Other Losses in Irrigation Systems." 336.

HORTON, HORACE EBENEZER.
Memoir of. 2221.

HOVEY, O. E.
Dumbarton Bridge construction. 1616.

HOWALT, W. J. C.
Notes on bridgework. 249.

HOWE, WALTER C.
Street railway track construction. 466.

HOWE, WILLIAM BELL WHITE.
Memoir of. 2234.

HOYT, JOHN C.
Cup and screw current meters. 848.

HUDSON, C. W.
The Sewickley Cantilever Bridge. 631.

HUNT, RALPH H.
Prevention of mosquito breeding. 771.

JACKSON, THOMAS MOORE.
Memoir of. 2236.

JOHNSTON, CLARENCE T.
State and national water laws. 677.

KETCHUM, MILO S.
Theorem of three moments. 807.

KNAP, E. D.
Tufa cement. 554.

KNOWLES, MORRIS.
Irrigation and river control. 1455.
Pittsburgh flood of March 22d, 1912. 332.
State and national water laws. 698.

KUICHLING, E.
Ground-water in sewers. 1925.

LE CONTE, L. J.
Dumbarton Bridge construction. 1614.
Irrigation and river control. 1454.
Long-time tests of Portland cement. 1035.
Pittsburgh flood of March 22d, 1912. 326.
Ports of the Pacific. 221.
Seepage losses in irrigation systems. 364.
State and national water laws. 689.
The Sewickley Cantilever Bridge. 628.
Tufa cement. 549.

LEDOUX, J. W.
"A Mechanism for Metering and Recording the Flow of Fluids Through Venturi Tubes, Orifices, or Conduits, by Integrating the Velocity Head." 1148.

LEFFLER, B. R.
"Specifications for Metal Railroad Bridges Movable in a Vertical Plane." 370.

LEWIS, E. W.
Track elevation. 1900.

LEWIS, JOHN H.
"State and National Water Laws, with Detailed Statement of the Oregon System of Water Titles." 637.

LILLY, W. E.
"The Strength of Columns." 258.

LIPPINCOTT, J. B.
"Tufa Cement, as Manufactured and Used on the Los Angeles Aqueduct." 520.

LOCKWOOD, WILLIAM FREDERICK.
Memoir of. 2238.

LONGLEY, FRANCIS F.
Weir discharge experiments. 1086.

LONGWELL, J. S.
"Experiments on Weir Discharge." 1045.

LUIGGI, LUIGI.
Tufa cement. 567.

McCULLOUGH, ERNEST.
Theory of reinforced concrete joists. 152.

MARSHALL, U. S.
Irrigation and river control. 1555.

MEAD, ELWOOD.
Irrigation and river control. 1506.

MEANS, THOMAS H.
Prevention of mosquito breeding. 778.

MEEM, J. C.
Water-bound macadam roads. 994.

MEEM, J. L.
"A Suggested Improvement in Building Water-Bound Macadam Roads." 988.

MERCER, CHARLES H.
Movable railroad bridges. 406.

MERRILL, O. C.
State and national water laws. 719.

MILLER, CHARLES H.
Cup and screw current meters. 846.

MILLER, SPENCER.
"Prevention of Mosquito Breeding." 759.
Sanitation of construction camps. 510.

MITCHELL, LOUIS A.
Street railway track construction. 474.

MOGENSEN, O. E.
Tufa cement. 556.

MOHUN, EDWARD.
Memoir of. 2239.

MOORE, W. E.
State and national water laws. 692.

MYERS, WILLIAM MADISON.
Memoir of. 2256.

OESTREICH, H. L.
Sixth Avenue Subway, Hudson & Manhattan R. R. 71.

O'HARA, J. M.
Tufa cement. 548.

OWEN, JAMES.
Tidal phenomena in New York Harbor. 2098.

PAGE, LOGAN WALLER.
Oil-mixed mortars and concretes. 1103.

PAGON, W. WATTERS.
"Maximum Stresses in Bascule Trusses." 73.

PAINE, PAUL M.
"The Use of Cement for Excluding Water from Oil Sands in Drilling Wells." 1644.

PARKER, WILLIAM P.
Notes on bridgework. 250.

PARSONS, H. DE B.
"Tidal Phenomena in the Harbor of New York." 1979.

PAUL, CHARLES H.
Tufa cement. 560.

PAYROW, HARRY G.
Sanitation of construction camps. 515.

PETERSON, O. W.
Tufa cement. 565.

PHELPS, EARLE B.
"The Absorption of Oxygen by De-Aerated Water." 1624.

PIERCE, C. H.
Weir discharge experiments. 1078.

POLK, A. C.
"A Brief Description of a Modern Street Railway Track Construction." 455.

POWELL, A. O.
Ports of the Pacific. 155.

PRICE, W. G.
Cup and screw current meters. 841.

PRICHARD, HENRY S.
Strength of columns. 283.

PUFFER, WILLIAM HASELTON.
Memoir of. 2241.

PUGH, MARSHALL R.
Ground-water in sewers. 1932.

PULLIGNY, JEAN DE.
Pittsburgh flood of March 22d, 1912. 331.

QUIMBY, HENRY H.
Kinetic effects of crowds. 2127.
The Sewickley Cantilever Bridge. 631.

RAMSBOTHAM, JOSHUA FIELDEN.
"Fremantle Graving Dock: Steel Dam Construction for North Wall." 1942.

RANKIN, EDWARD S.
Ground-water in sewers. 1917.

REED, RALPH J.
Tufa cement. 550.

REICH, P. J.
Movable railroad bridges. 413.

RICHARDSON, CLIFFORD.
Tufa cement. 551.

RIGHTS, LEWIS D.
Dumbarton Bridge construction. 1619.

ROBSON, F. T.
Irrigation and river control. 1516.

ROSENTHAL, J. J.
Prevention of mosquito breeding. 770.

RUTHERFURD, ROBERT A.
Prevention of mosquito breeding. 775.

SANBORN, THOMAS.
"Some Experiments with Mortars and Concretes Mixed with Asphaltic Oils." 1094.

SAVILLE, CALEB MILLS.
"Hydrology of the Panama Canal." 871.

SCHNEIDER, E. J.
"Construction Problems, Dumbarton Bridge, Central California Railway." 1572.

SCHUYLER, JAMES DIX.
Memoir of. 2243.

SCOTT, DUNBAR D.
"Recent Improvements in Leveling Instruments." 1172.

SELLEW, FRANCIS L.
Irrigation and river control. 1456.

SEWELL, H. A.
"A Shortened Method in Arch Computation." 133.

SHELEY, HORACE W.
State and national water laws. 696.

SMITH, AUGUSTUS.
Movable railroad bridges. 403.

SMITH, J. WALDO.
Pittsburgh flood of March 22d, 1912. 331.

SNOW, J. P.
Track elevation. 1900.

SOULÉ, FRANK.
Memoir of. 2246.

STANIFORD, C. W.
Cup and screw current meters. 852.

STEWARD, W. G.
"Experiments on Weir Discharge." 1045.

STRAUB, THEODORE A.
The Sewickley Cantilever Bridge. 629.

SWAIN, GEORGE FILLMORE.
"Some Tendencies and Problems of the Present Day and the Relation of the Engineer Thereto." Address at the Annual Convention, in Ottawa, Ontario, June 18th, 1913. 1112.

SWEETSER, C. H.
Water-bound macadam roads. 991.

TAYLOR, ARTHUR.
"Some Experiments with Mortars and Concretes Mixed with Asphaltic Oils." 1094.

THOMSON, T. KENNARD.
Tidal phenomena in New York Harbor. 2096.

TILDEN, C. J.
"Kinetic Effects of Crowds." 2107.

TISDALE, CHARLES HARRY.
Memoir of. 2258.

TRATMAN, E. E. R.
Street railway track construction. 466.

VILAR Y BOY, S.
"Notes on Bridgework." 241.

VORCE, C. B.
Street railway track construction. 478.

WAGNER, SAMUEL TOBIAS.
"The Elevation of the Tracks of the Philadelphia Germantown and Norristown Railroad, Philadelphia, Pa." 1819.

WAGONER, LUTHER.
Seepage losses in irrigation systems. 367.
Tufa cement. 553.

WEBSTER, GEORGE S.
Track elevation. 1901.

WHEELER, EBENEZER SMITH.
Memoir of. 2249.

WHINERY, S.
Street sprinkling. 87.

WHITE, HENRY FISHER.
Memoir of. 2251.

WHITE, LAZARUS.
Sixth Avenue Subway, Hudson & Manhattan R. R. 70.

WHITNEY, T. B., Jr.
Sixth Avenue Subway, Hudson & Manhattan R. R. 66.

WILLIAMS, J. P. J.
"The Theorem of Three Moments." 785.

WINSOR, FRANK E.
Sanitation of construction camps. 510.

WISE, JAMES HUGH.
Memoir of. 2260.

WORTHINGTON, CHARLES.
The Sewickley Cantilever Bridge. 628.